

Listing of Claims

1 - 31 (canceled)

32. (new) A method for remediating drilled cuttings containing oil and water from a wellbore, the method comprising

introducing drilled cuttings with oil and water to a system for remediation, the system including a thermal treatment system and a condensing system,

feeding a slurry of the cuttings with oil and water to the thermal treatment system and heating the drilled cuttings and oil and water therein producing heated cuttings and a stream with oil and water and solids therein,

discharging the heated cuttings from the thermal treatment system,

feeding the stream with oil and water and solids therein to a dual component separation system producing separated-out solids and a vapor with oil and water therein,

feeding the vapor to a condenser system producing a liquid stream,

feeding the liquid stream to an oil/water separator apparatus producing an oil stream and a water stream,

wherein a cooling apparatus provides cooling fluid for cooling the condenser to enhance effectiveness of the condenser, the method further comprising

cooling the condenser with cooling fluid from the cooling apparatus.

33. (new) The method of claim 32 further comprising

quenching the vapor with oil and water therein in a quench system prior to feeding said vapor to the condenser system.

34. (new) The method of claim 33 wherein the quench system is operated so that its heat content remains substantially constant.

35. (new) The method of claim 34 wherein the quench system comprises a vessel, inlet means for receiving the vapor with oil and water, and spray means for spraying cooling liquid into said vapor, and the method further comprising

4 spraying with the spray means said vapor with cooling liquid.

1 36. (new) The method of claim 35 wherein the cooling liquid includes liquid
2 recirculated from the vessel to the spray means, the method further comprising
3 recirculating cooling liquid from the vessel to the spray means.

1 37. (new) The method of claim 35 wherein the spray means sprays cooling
2 liquid into the inlet means.

1 38. (new) The method of claim 35 wherein the spray means sprays cooling
2 liquid into the vessel.

1 39. (new) The method of claim 33 further comprising
2 pumping uncondensed quenched vapor to the condenser system.

1 40. (new) The method of claim 32 further comprising
2 recirculating vapor through the dual component separator to
3 enhance efficiency of solids separation by the dual component separator.

1 41. (new) The method of claim 32 wherein the dual component separator is
2 insulated to reduce condensation of material within the dual component separator.

1 42. (new) The method of claim 32 further comprising
2 centrifuging the oil stream from the oil/water separator apparatus
3 to clean oil in said oil stream.

1 43. (new) The method of claim 32 wherein an initial mixture of wellbore
2 cuttings, oil, water and drilling fluid is fed to a shaker system, the method further
3 comprising
4 producing the slurry of drilled cuttings with oil and water with the
5 shaker system.

1 44. (new) The method of claim 32 further comprising, prior to feeding the
2 slurry to the thermal treatment system,

3 feeding the slurry through a secondary separator system to a
4 hopper,

5 separating large pieces of material from the slurry with the
6 secondary separator system, and then

7 feeding the slurry from the hopper to the thermal treatment
8 system.

1 45. (new) The method of claim 32 wherein the slurry contains by volume a

100% mixture of up to about 30% oil, up to about 30% water, and up to about 50% drilled cuttings and the method processes at least about 2 tons per hour of slurry.

46. (new) The method of claim 32 wherein the slurry contains by volume about 38% water and the method processes about 1.2 tons per hour of slurry.

47. (new) The method of claim 32 wherein the slurry includes fine particulates and the dual component separator system is for removing fine particulates, the method further comprising prior to feeding the stream with oil and water to the condenser system,

separating out with the dual component separator system fine particulates from the stream with oil and water.

48. (new) The method of claim 32 wherein the slurry has hydrocarbon contaminants therein and the method further comprising

volatilizing the hydrocarbon contaminants in the thermal treatment system to separate them from the slurry.

49. (new) The method of claim 32 wherein the slurry has volatilizable contaminants therein and the method further comprising

volatilizing the volatilizable contaminants in the thermal treatment system to separate them from the slurry.

50. (new) The method of claim 32 wherein the system includes heat exchange apparatus and the method further comprising

cooling the liquid stream prior to feeding it to the oil/water separator.

51. (new) The method of claim 32 further comprising

feeding the oil stream from the oil/water separator to the thermal treatment system for fuel for the thermal treatment system.

52. (new) The method of claim 32 wherein the system includes rehydration apparatus and the method further comprising

rehydrating the discharged heated cuttings from the thermal treatment system with the rehydration apparatus to facilitate handling of the heated cuttings.

53. (new) The method of claim 32 wherein the system includes scrubber apparatus for cleaning heated cuttings exhausted from the thermal treatment system,

3 the method further comprising

4 scrubbing said heated cuttings with the scrubber apparatus.

1 54. (new) The method of claim 32 wherein the system includes scrubber
2 apparatus for cleaning solids exhausted from the dual component separator, the
3 method further comprising

4 scrubbing said solids with the scrubber apparatus.

1 55. (new) The method of claim 32 further comprising

2 feeding the heated cuttings from the thermal treatment system to
3 mill apparatus for hydration.

1 56. (new) The method of claim 32 further comprising

2 feeding the separated-out solids from the dual component
3 separator to mill apparatus for hydration.

57. (new) A method for remediating drilled cuttings containing oil and water
from a wellbore, the method comprising

5 introducing drilled cuttings with oil and water to a system for
remediation, the system including a thermal treatment system and a condensing
system,

10 feeding a slurry of the cuttings with oil and water to the thermal
treatment system and heating the drilled cuttings and oil and water therein
producing heated cuttings and a stream with oil and water and solids therein,
discharging the heated cuttings from the thermal treatment
system,

feeding the stream with oil and water and solids therein to a dual
component separation system producing separated-out solids and a vapor with
oil and water therein,

15 feeding the vapor to a condenser system producing a liquid stream,
feeding the liquid stream to an oil/water separator apparatus
producing an oil stream and a water stream,

producing noncondensables with the condenser, and
oxidizing the noncondensables.

58. (new) The method of claim 57 wherein the noncondensables are oxidized
in a thermal oxidizer.

59. (new) A method for remediating drilled cuttings containing oil and water from a wellbore, the method comprising

introducing drilled cuttings with oil and water to a system for remediation, the system including a thermal treatment system and a condensing system,

feeding a slurry of the cuttings with oil and water to the thermal treatment system and heating the drilled cuttings and oil and water therein producing heated cuttings and a stream with oil and water and solids therein, discharging the heated cuttings from the thermal treatment system,

feeding the stream with oil and water and solids therein to a dual component separation system producing separated-out solids and a vapor with oil and water therein,

feeding the vapor to a condenser system producing a liquid stream, feeding the liquid stream to an oil/water separator apparatus producing an oil stream and a water stream, and

wherein the thermal treatment system comprises a vessel with an interior wall dividing the vessel into two intercommunicating chambers, the vessel having two spaced-apart ends and a burner at each end for heating the drilled cuttings in each chamber.

60. (new) The method of claim 59 wherein each burner is in a separate firebox adjacent each chamber.

61. (new) The method of claim 59 wherein each burner is mounted within the vessel.

Pending Claims

1 **32. (new)** A method for remediating drilled cuttings containing oil and water
2 from a wellbore, the method comprising
3 introducing drilled cuttings with oil and water to a system for
4 remediation, the system including a thermal treatment system and a condensing
5 system,
6 feeding a slurry of the cuttings with oil and water to the thermal
7 treatment system and heating the drilled cuttings and oil and water therein
8 producing heated cuttings and a stream with oil and water and solids therein,
9 discharging the heated cuttings from the thermal treatment
10 system,
11 feeding the stream with oil and water and solids therein to a dual
12 component separation system producing separated-out solids and a vapor with
13 oil and water therein,
14 feeding the vapor to a condenser system producing a liquid stream,
15 feeding the liquid stream to an oil/water separator apparatus
16 producing an oil stream and a water stream,
17 wherein a cooling apparatus provides cooling fluid for cooling the
18 condenser to enhance effectiveness of the condenser, the method further
19 comprising
20 cooling the condenser with cooling fluid from the cooling
21 apparatus.

1 **33. (new)** The method of claim 32 further comprising
2 quenching the vapor with oil and water therein in a quench system
3 prior to feeding said vapor to the condenser system.

1 **34. (new)** The method of claim 33 wherein the quench system is operated so
2 that its heat content remains substantially constant.

1 **35. (new)** The method of claim 34 wherein the quench system comprises a
2 vessel, inlet means for receiving the vapor with oil and water, and spray means for
3 spraying cooling liquid into said vapor, and the method further comprising
4 spraying with the spray means said vapor with cooling liquid.

1 36. (new) The method of claim 35 wherein the cooling liquid includes liquid
2 recirculated from the vessel to the spray means, the method further comprising
3 recirculating cooling liquid from the vessel to the spray means.

1 37. (new) The method of claim 35 wherein the spray means sprays cooling
2 liquid into the inlet means.

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1 41. (new) The method of claim 32 wherein the dual component separator is
2 insulated to reduce condensation of material within the dual component separator.

1 42. (new) The method of claim 32 further comprising
2 centrifuging the oil stream from the oil/water separator apparatus
3 to clean oil in said oil stream.

1 43. (new) The method of claim 32 wherein an initial mixture of wellbore
2 cuttings, oil, water and drilling fluid is fed to a shaker system, the method further
3 comprising

4 producing the slurry of drilled cuttings with oil and water with the
5 shaker system.

1 44. (new) The method of claim 32 further comprising, prior to feeding the
2 slurry to the thermal treatment system,

3 feeding the slurry through a secondary separator system to a
4 hopper,

5 separating large pieces of material from the slurry with the
6 secondary separator system, and then

7 feeding the slurry from the hopper to the thermal treatment
8 system.

1 45. (new) The method of claim 32 wherein the slurry contains by volume a
2 100% mixture of up to about 30% oil, up to about 30% water, and up to about 50%

3 drilled cuttings and the method processes at least about 2 tons per hour of slurry.

1 46. (new) The method of claim 32 wherein the slurry contains by volume about
2 38% water and the method processes about 1.2 tons per hour of slurry.

1 47. (new) The method of claim 32 wherein the slurry includes fine particulates
2 and the dual component separator system is for removing fine particulates, the method
3 further comprising prior to feeding the stream with oil and water to the condenser
4 system,

5 separating out with the dual component separator system fine
6 particulates from the stream with oil and water.

1 48. (new) The method of claim 32 wherein the slurry has hydrocarbon
2 contaminants therein and the method further comprising

3 volatilizing the hydrocarbons contaminants in the thermal treatment
4 system to separate them from the slurry.

1 49. (new) The method of claim 32 wherein the slurry has volatilizable
2 contaminants therein and the method further comprising

3 volatilizing the volatilizable contaminants in the thermal treatment
4 system to separate them from the slurry.

1 50. (new) The method of claim 32 wherein the system includes heat exchange
2 apparatus and the method further comprising

3 cooling the liquid stream prior to feeding it to the oil/water
4 separator.

1 51. (new) The method of claim 32 further comprising

2 feeding the oil stream from the oil/water separator to the thermal
3 treatment system for fuel for the thermal treatment system.

1 52. (new) The method of claim 32 wherein the system includes rehydration
2 apparatus and the method further comprising

3 rehydrating the discharged heated cuttings from the thermal
4 treatment system with the rehydration apparatus to facilitate handling of the
5 heated cuttings.

1 53. (new) The method of claim 32 wherein the system includes scrubber
2 apparatus for cleaning heated cuttings exhausted from the thermal treatment system,
3 the method further comprising

4 scrubbing said heated cuttings with the scrubber apparatus.

1 54. (new) The method of claim 32 wherein the system includes scrubber
2 apparatus for cleaning solids exhausted from the dual component separator, the
3 method further comprising

4 scrubbing said solids with the scrubber apparatus.

1 55. (new) The method of claim 32 further comprising

2 feeding the heated cuttings from the thermal treatment system to
3 mill apparatus for hydration.

1 56. (new) The method of claim 32 further comprising

2 feeding the separated-out solids from the dual component
3 separator to mill apparatus for hydration.

57. (new) A method for remediating drilled cuttings containing oil and water
from a wellbore, the method comprising

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remediation, the system including a thermal treatment system and a condensing
5 system,

feeding a slurry of the cuttings with oil and water to the thermal
treatment system and heating the drilled cuttings and oil and water therein
producing heated cuttings and a stream with oil and water and solids therein,
discharging the heated cuttings from the thermal treatment
10 system,

feeding the stream with oil and water and solids therein to a dual
component separation system producing separated-out solids and a vapor with
oil and water therein,

feeding the vapor to a condenser system producing a liquid stream,
15 feeding the liquid stream to an oil/water separator apparatus
producing an oil stream and a water stream,
producing noncondensables with the condenser, and
oxidizing the noncondensables.

58. (new) The method of claim 57 wherein the noncondensables are oxidized
in a thermal oxidizer.

59. (new) A method for remediating drilled cuttings containing oil and water

from a wellbore, the method comprising

introducing drilled cuttings with oil and water to a system for remediation, the system including a thermal treatment system and a condensing system,

5 feeding a slurry of the cuttings with oil and water to the thermal treatment system and heating the drilled cuttings and oil and water therein producing heated cuttings and a stream with oil and water and solids therein, discharging the heated cuttings from the thermal treatment system,

10 feeding the stream with oil and water and solids therein to a dual component separation system producing separated-out solids and a vapor with oil and water therein,

 feeding the vapor to a condenser system producing a liquid stream, feeding the liquid stream to an oil/water separator apparatus
15 producing an oil stream and a water stream, and

 wherein the thermal treatment system comprises a vessel with an interior wall dividing the vessel into two intercommunicating chambers, the vessel having two spaced-apart ends and a burner at each end for heating the drilled cuttings in each chamber.

20 60. (new) The method of claim 59 wherein each burner is in a separate firebox
21 adjacent each chamber.

1 61. (new) The method of claim 59 wherein each burner is mounted within the
2 vessel.